

WHAT IS CLAIMED IS:

1. A surface acoustic wave apparatus comprising:
a surface acoustic wave device provided on a piezoelectric substrate, said surface acoustic wave device including at least one interdigital electrode, and balanced signal terminals provided for at least an input side and an output side;

a multi-layered retaining substrate including external terminals for connecting the balanced signal terminals to an external device, said multi-layered retaining substrate being provided to retain said surface acoustic wave device such that the at least one interdigital electrode faces a surface of said multi-layered retaining substrate; and

an electrical circuit provided between layers of said multi-layered retaining substrate such that said electrical circuit is located between the balanced signal terminals and the external terminals so as to increase a balance degree between the balanced signal terminals.

2. A surface acoustic wave apparatus according to claim 1, further comprising a package for accommodating the surface acoustic wave device, wherein the external terminals are disposed substantially symmetrically with respect to a central portion of the package via said electrical circuit.

10052370.012302

3. A surface acoustic wave apparatus according to claim 1, wherein said electrical circuit comprises an adjusting portion provided for at least one of the balanced signal terminals of said surface acoustic wave device to improve a signal propagation characteristic of the balanced signal terminal.

4. A surface acoustic wave apparatus according to claim 3, wherein said adjusting portion is defined by at least one of a delay line, a reactance component, and a resistance component.

5. A surface acoustic wave apparatus according to claim 3, wherein said electrical circuit comprises the adjusting portions for both the balanced signal terminals of said surface acoustic wave device.

6. A surface acoustic wave apparatus according to claim 5, wherein an adjusting degree of one of the adjusting portions for one of the balanced signal terminals is different from an adjusting degree of the other adjusting portion for the other balanced signal terminal.

7. A surface acoustic wave apparatus according to

20250709 0422500T

claim 1, wherein said surface acoustic wave device comprises a longitudinally-coupled resonator mode surface acoustic wave element having at least three interdigital electrodes.

8. A surface acoustic wave apparatus according to claim 1, wherein said surface acoustic wave device is constructed such that an electrical neutral point is not provided between the balanced signal terminals.

9. A communication apparatus comprising at least one surface acoustic wave apparatus set forth in claim 1.

10. A surface acoustic wave apparatus according to claim 1, wherein a die attach portion is provided on a top surface of an upper layer of said multi-layered retaining substrate to electrically connect the surface acoustic wave device to the electrical circuit.

11. A surface acoustic wave apparatus according to claim 10, wherein the surface acoustic wave device is electrically and mechanically connected to the die attach portion via bumps.

12. A surface acoustic wave apparatus according to claim 10, wherein the die attach portion is electrically and

20250701.012302

mechanically connected to the electrical circuit by via
holes ⁽⁴¹⁸⁽⁴¹⁹⁾⁾ provided in the upper layer of the multi-layered
retaining substrate.

13. A surface acoustic wave apparatus according to
claim 7, wherein the longitudinally-coupled resonator mode ²³
surface acoustic wave element further includes at least two
reflectors sandwiching the at least three interdigital
electrodes.

14. A surface acoustic wave apparatus according to
claim 1, wherein the external terminals are provided on a
bottom surface of a bottom layer of the multi-layered
retaining substrate.

15. A surface acoustic wave apparatus comprising:
a surface acoustic wave device provided on a
piezoelectric substrate, said surface acoustic wave device
including at least one interdigital electrode, and two
balanced signal terminals and an unbalanced signal terminal;
a multi-layered retaining substrate defined by at least
an top layer and a bottom layer and including external
terminals for connecting the two balanced signal terminals
and the unbalanced signal terminal to an external device,
said multi-layered retaining substrate being arranged such

10052370.042302

that the at least one interdigital electrode faces a surface of said multi-layered retaining substrate; and

a plurality of wiring patterns provided between the top and bottom layers of said multi-layered retaining substrate such that said plurality of wiring patterns are located between the two balanced signal terminals and the external terminals and between the unbalanced signal terminal and the external electrodes so as to increase a balance degree between the balanced signal terminals.

16. A surface acoustic wave apparatus according to claim 15, further comprising a package for accommodating the surface acoustic wave device, wherein the external terminals are disposed substantially symmetrically with respect to a central portion of the package via said plurality of wiring patterns.

17. A surface acoustic wave apparatus according to claim 15, wherein said plurality of wiring patterns comprises an adjusting portion provided for at least one of the balanced signal terminals of said surface acoustic wave device to improve a signal propagation characteristic of the balanced signal terminal.

18. A surface acoustic wave apparatus according to

10552370.012302

claim 17, wherein said adjusting portion is defined by at least one of a delay line, a reactance component, and a resistance component.

19. A surface acoustic wave apparatus according to claim 17, wherein said plurality of wiring patterns comprises the adjusting portions for both of the balanced signal terminals of said surface acoustic wave device.

20. A surface acoustic wave apparatus according to claim 19, wherein an adjusting degree of one of the adjusting portions for one of the balanced signal terminals is different from an adjusting degree of the other adjusting portion for the other balanced signal terminal.

20250704 09:23:04